A Delphi approach to arrive at European consensus on the concepts and measurement of spasticity

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Background

To support clinical decision making, physical examination is used to assess spasticity via passive joint movement at different velocities. However, what exactly is being assessed is expressed and interpreted in different ways. A clear diagnostic conceptual framework of the responses to passive muscle stretch is lacking. This hampers communication between clinicians. It is a prerequisite for the development of precise assessment using instrumented measures.

Aim

The aim was to arrive at unambiguous terminology about the concepts of and phenomena around response to passive muscle stretch and to design the assessment of the conceptual elements.

Method

During two consensus meetings, 30 clinicians and researchers from 10 European countries filled online questionnaires based on a Delphi approach (anonymous, 2 rounds, 20 statements, using the Likert-scale), followed by plenary discussion after rounds. Consensus was reached when agreement ≥75%.

Results

The term *hyper-resistance* should be used to describe the phenomenon of impaired neuromuscular function during passive stretch, instead of 'spasticity' or 'hypertonia'. It is essential to distinguish *non-neural* (tissue-related) from *neural* (central nervous system related) contributions to hyper-resistance. Tissue properties consist of elasticity, viscosity and muscle shortage. The neural contributions are velocity-dependent *stretch hyperreflexia* and non-velocity dependent *involuntary background activation*. The term spasticity should only be used next to the term stretch hyperreflexia. When joint angle, moment and electromyography are measured, the 3 components of hyper-resistance can be quantitatively assessed.

Conclusion

A conceptual framework of the pathophysiological responses to passive muscle stretch is defined and related to objective assessment. After experimental validation of the parameters related to the

components, they can be used to develop treatment algorithms that are based on the aetiology of the clinical phenomena.